

David C. Clift

SOUTH HALL
COLUMBIA UNIVERSITY
NEW YORK



1935



SOUTH HALL

Photograph by Walter L. Bogert, '88

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PREFATORY NOTE

It is customary to publish for distribution at the dedication exercises for a notable library building some more or less adequate description of its main features, emphasizing as a rule its architectural and engineering aspects. For South Hall, the new library building of Columbia University, it had been hoped to prepare and publish in time for the dedication an unusually complete description written primarily from the point of view of library administration. When for unavoidable reasons this plan had to be given up it was decided to ask the architect and several other persons to prepare brief articles describing certain features of the building and its equipment with which they as consulting experts or subcontractors were especially familiar. These articles it also proved to be impossible to publish before the building was dedicated, 30 November, 1934. They are now brought together, along with President Butler's dedication address and an article on moving the books into South Hall, by Miss Helen H. Yerkes, Supervisor of Stacks, as a special number of the COLUMBIA UNIVERSITY QUARTERLY and in this convenient form will provide information of a kind which will be in demand for many years. The publication of a more complete and systematic description of the building, covering details of special interest to librarians and including some discussion of several features which represent innovations in library planning, is still contemplated.

The principal dedication address, given by Mr. John Buchan, who has since been elevated to the peerage as Lord Tweedsmuir and appointed Governor General of Canada, was printed in the QUARTERLY of December, 1934. Mr. King's article on the heating and ventilating system appeared by permission in the *Library Journal* of 1 April, 1935. Several of the illustrations were published in the *Columbia Alumni News* for 23 November, 1934, and are used through the courtesy of the editor.

CHARLES C. WILLIAMSON
Director of University Libraries

29 July, 1935

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THE LIBRARIES OF COLUMBIA

ADDRESS AT THE DEDICATION OF SOUTH HALL

NICHOLAS MURRAY BUTLER '82

These simple ceremonies mark an event of outstanding importance in the history of this University. With the completion and occupancy of this noble building, there is added to the University's resources and equipment a true laboratory-library where scholars old and young are to work with books and in companionship with books for generations to come.

It is significant that just now a new and noble library has been added to the resources of the University of Cambridge, and that extensive additions are making to the historic Bodleian Library at Oxford.

Under present-day conditions a thoroughly modern and well-equipped library is the very heart and center of the work of any institution for higher education. The old-fashioned notion that a library is a building in which books are to be stored and only drawn out occasionally and under severe administrative restrictions, has been put behind us forever.

In my own student days at the University of Berlin, it was required that a written request for a book must be handed in at the desk before two o'clock on the afternoon of one day in order that the book itself might possibly be had at any time after noon on the following day. Here in this building a student or reader may find at his disposal the book for which he asks, within from three to five minutes.

All effective modern teaching refers to sources of knowledge, and makes constant use of these sources. No serious and well-trained student takes anything for granted, but insists upon examining, and being permitted to examine, the original authority upon which a given statement or fact

rests. This is why a modern laboratory-library is of such vital importance.

This building, so thoroughly well planned by the architects in consultation with the library administration and so splendidly built by the contractors, had most practical ends in view. These included convenient public use by our scholars and students; economical storage of great collections of books, both now and for years to come; and every facility for competent, economical and speedy administration.

There are now concentrated in this great building book collections which heretofore have of necessity been scattered in a dozen places, and thereby the work of faculties, of students, and of library staff are all aided and made easier. The central stack room brings together the greater part of the books in a single storage reservoir, so simplifying consultation, distribution and control. The hundreds of private studies and individual study-tables make it easy and practicable for individual scholars and students to do their work for hours at a time with a central book supply at their hand.

The Browsing Room affords that encouragement to the reading of the best literature for its own sake, which is quite as much a part of the function of a university library as it is that of a public library.

The building has been so planned that the readers and the staff are able to work on its periphery, where direct light and air are available, while for the most part, the books, which require light only when being consulted, and for which uncontrolled light is injurious, are housed in the great central spaces. Through a modern air conditioning system in the stacks, it is aimed to provide that temperature, humidity and freedom from chemical and physical influences which are necessary to the preservation of books and their bindings. The present capacity of the building is three million volumes, with possible accommodation for four million volumes.

To the architect who has planned this building in its every part, to the library staff which has aided and consulted with the architect as to every detail of arrangement and administration, and to the builders whose skill and devotion are shown in every part of the building's strength

and beauty, this University owes a heavy debt of gratitude.

Words fail me to express our sense of obligation to the friend of so many of us whose princely benefaction has made possible the erection of this great building. As the years pass may he be comforted and made happy by the reflection upon the crowning service to mankind which his great benefactions both in this country and in England have rendered.

It is a far cry from the opening of this building to conditions in years gone by. The first entry in the records of the Trustees relating to a library is to be found in the minutes of 12 May, 1761. It records the fact that the President of King's College, Dr. Johnson, desired some directions about the library of books given to this Corporation by the late Reverend Doctor Duncombe Bristowe of London. Directions were given that this library was to be "delivered to Mr. William Neat, of London, Merchant, who is to call for them, ship them, properly insured, to King's College."

From that time on the records abound in references to books and a library of some sort or other, although the library was so small as to be quite insignificant when judged by the standards of today. In 1763 the Trustees expressed the opinion that "it is high time that a librarian be appointed with a small salary, and that he be furnished with such rules and directions as may tend to the preservation of the books committed to his care."

In order to give practical effect to this opinion, the teacher of mathematics in the college was appointed librarian, at a salary of ten pounds per annum. Mr. Robert Harpur, who was designated librarian, was ordered to make a catalog of the books that were then or might thereafter belong to the library of the college, and deliver a copy thereof to the President of the College and another copy to the Clerk of the Corporation, and it was significantly added that he be "Accountable for the said books."

It is of pathetic interest to read in the minutes of the Trustees that the library expenditures for 1825 were \$177.44; 1827, \$44.57; 1832, \$51.75; 1843, \$100; 1851, \$400; 1862, \$500, an astonishing maximum!

In 1821 rather elaborate rules were adopted for the re-

ception, care and administration of the books belonging to the college library. Books of great value were to be given a particular mark, might only be consulted occasionally, and were not to be taken from the library without the permission of the President. It was also ordered that the library should be well aired and preserved from wet, that the librarian or his assistant should always be present when the library was open, and that no other person save the President should have a key to the library. No academic exercise might be held in the library, nor was it allowed to burn a candle or a lamp therein. About this time the junior professor in service, whoever he might be, became *ex officio* librarian under the direction of the President. In 1827 there was apparently some friction with that most distinguished scholar and mathematician, Professor Henry J. Anderson, himself afterward a very influential Trustee of the college, since it is recorded that Professor Anderson had declined to number and arrange the books in the library and that therefore nothing had yet been done about it.

Even as late as 1870 the librarian reported that the additions to the library during the year, including fifty-one bound volumes of periodicals and tracts, had amounted to three hundred and twenty-five volumes, of which eighty-nine were donations. The number of books in the library at that time had risen to 14,110.

The librarian proudly reported that the fund at his disposal at the beginning of the year was \$2485.54 and that he would be able to report an unexpended balance of \$1231.06.

It was reports of this kind which excited the ire of the late Professor Burgess, and which led him to involve the college in the unheard-of extravagance of buying a set of Hansard's *Parliamentary Debates* and sending the bill to the librarian.

Then President Barnard had his way, and brought about the appointment of Melvil Dewey to be librarian, and the whole situation speedily changed. Mr. Dewey was appointed on 7 May, 1883, to be librarian-in-chief of Columbia College, at the unheard-of salary of \$3500. It was then and only then that the present fortunate conditions began to develop and to develop rapidly.

In everything but name, therefore, the library of this

University is almost precisely fifty years old, and only that. When one undertakes to compare or rather to contrast the meaning of these records of past years with what surrounds us today, he may get a more vivid and impressive picture of the changes which the last generation has brought than would be possible in any other way. A professor, even one so distinguished as Dr. Anderson, might well hesitate if assigned the task of cataloging and classifying books in the University Library of today!

The books have in course of years become the constant companions of teachers, research workers and students. Without them there would be no university, and without them there could be no teaching worthy of the name in this year of grace.

This great and splendid building is not only a monument to the academic progress which has marked the years that are gone, but it is a prophecy of academic accomplishment yet to come. How better can this noble library building be described or how better dedicated to its purpose, than in the perfectly chosen words which the King used a few days ago in his address on the occasion of the opening of the new library of the University of Cambridge. They are words of perfect description. "It is a workshop of new knowledge and a storehouse of seasoned wisdom."

SOUTH HALL

CHARLES NELSON KENT '96

For many years prior to 1931 it was evident not only to the President and faculty but also to all the students and other users of it that the Low Library, the architectural gem of Columbia and one of the outstanding buildings in the country, was absolutely inadequate to house the various collections of the University Library, and also did not furnish the service either in space, equipment or arrangement necessary for housing the books and caring for the readers and research workers. In 1897, when the move was made from Forty-ninth Street to Morningside, the number of volumes in the Library was approximately 75,000, while in 1931 at the time work was begun on South Hall, the number had increased to 1,250,000. The Low Library had stacks and shelves sufficient to store only about 750,000 volumes, so the excess books were placed in various other buildings on the campus and thus occupied space which was not only inconvenient but also in demand for other purposes.

In 1930, through the generosity of that great benefactor of all fields of education, Mr. Edward S. Harkness, it was possible to begin a study of the needs for a new library building, which would contain proper facilities for the library and also for the School of Library Service. Sketches were accordingly made to meet these many and varied requirements in the best manner, but it was not until January, 1931, that the present location was definitely decided upon and drawings started for a building on that site.

Between September, 1930, and January, 1931, Dr. Charles C. Williamson, Director of Libraries, and Dean of the School of Library Service, in consultation with the architects and his assistants, made a very comprehensive program for the occupancy and needs of the new building. After several months of study in the architect's office a plan was drawn which was submitted to the Committee on Buildings and Grounds on 8 July, 1931, and was approved as submitted.

Then began that immense task of making the working drawings with all the complexities of coördination and consultation with the intricacies of the engineering requirements

demanding not only so much actual drafting work but many and long consultations and discussions necessary in a well-studied building.

Ground was broken and excavation started in the latter part of July, 1931, and the concrete footings and walls were brought up to the level of the steel, the setting of which was started in May, 1932. On 3 October, 1932, the corner-stone



SOUTH HALL, NORTH FAÇADE

was laid,¹ and from that time on work of all trades was carried on to completion.

In designing the exterior of the building the architect, Mr. James Gamble Rogers, fortunately had the good judgment to keep in mind the existing structures on the campus and South Field, and the skill to hold this building in harmony with the other buildings and to resist the temptation to make this the dominating building on the campus, which he could easily have done because of its great size. Happily he sub-

¹ An account of the ceremony was published in the *QUARTERLY* of Dec. 1932, XXIV, 396-398.

ordinated this building to that central gem, the Low Library, and kept the new building in the same general scheme of design laid out some forty years ago by Mr. McKim, without dwarfing the surrounding structures.

The design finally settled on was Italian Renaissance, in keeping with the rest of the group, having a granite base to the level of the second floor, and above that employing Indiana limestone and red brick. The main entrance from South Field is on the second floor level.

On the north façade beginning at the third story is placed a colonnade of fourteen Ionic columns thirty-two feet in height extending across the front of the building. Over the main entrance are placed three stone seals, that on the left being the seal of King's College, 1755-1784; the one on the right, the seal of the College under the Regents of the University of the State of New York, 1784-1787; and the center one the seal of Columbia College from 1787 to the present time. On the main frieze over the columns are carved the names of men famous in literature, and in the small stone panels over the low windows in the main reading room are carved the names of twelve American statesmen and twelve American men of letters.

These are as follows:

Front

HOMER • HERODOTUS • SOPHOCLES • PLATO • ARISTOTLE
DEMOSTHENES • CICERO • VERGIL

West Side

HORACE • TACITUS • ST. AUGUSTINE • ST. THOMAS • AQUINAS • DANTE

East Side

CERVANTES • SHAKESPEARE • MILTON • VOLTAIRE • GOETHE

American Statesmen

GEORGE WASHINGTON	JOHN ADAMS	ALEXANDER HAMILTON
BENJAMIN FRANKLIN	THOMAS JEFFERSON	JOHN JAY
JAMES MADISON	JOHN QUINCY ADAMS	DANIEL WEBSTER
JOHN MARSHALL	HENRY CLAY	ABRAHAM LINCOLN

American Men of Letters

JONATHAN EDWARDS	JAMES FENIMORE COOPER
WASHINGTON IRVING	WILLIAM CULLEN BRYANT
RALPH WALDO EMERSON	HENRY WADSWORTH LONGFELLOW
NATHANIEL HAWTHORNE	EDGAR ALLAN POE
HENRY DAVID THOREAU	WALT WHITMAN
HERMAN MELVILLE	MARK TWAIN

The stack room is in the center interior of the building starting in the basement and extending to the roof, having fifteen tiers in all and entirely isolated from the work rooms and reading rooms by a brick fire wall with fire doors at all openings. This stack room has a book capacity of 2,955,000 volumes at the present time and the steel structure of the stack is designed to carry additional tiers giving a possible future capacity of 1,080,000 more books. For further extension, tunnels are so arranged that the basement of future buildings may be utilized for book storage.

The stack contains two independent stairways and two electric elevators as well as two shafts for the installation of additional cars when the service demands them. There is an electric booklift for the transportation of books, and an electrically driven book conveyor which will deliver books from any stack level to the delivery desk on the third floor. A pneumatic tube system connects the delivery desk with all stack levels and also with the various departmental libraries.

The stack is supplied with an air conditioning system which furnishes a constant supply of fresh air for the occupants and is also expected to be of great value in the preservation of the books.

On the first floor at the easterly entrance on 114th Street is located a sub-branch of the New York Public Library which serves the University and the surrounding neighborhood with books for general reading.

The Harkness Academic Theater is on this floor and is equipped with air conditioning, which makes it particularly suitable for use in the summer months. There is a projection room, equipped with a projector for motion pictures as well as for slides. The seating capacity of this room is about three hundred. The Binding, the Shipping and Receiving, the Order and Accessions Departments, Staff Lounge and rest rooms and newspaper stacks occupy the balance of the floor.

The second floor of the building contains the Columbia College Library, which has its own delivery room, on the walls of which are hung the portraits of the four deans of the college, Drisler, Van Amringe, Keppel and Hawkes. Opening from the delivery desk are the Reference Room, the

Science Reading Room, the Librarian's Office and the Reading Room, which has a seating capacity of two hundred and fifty. The woodwork of this room is cherry, walnut and maple, all three being harmoniously assembled in the book-cases and trim. The marble pilasters are of Istrian nuage which is the same marble as used throughout the rest of the



READING ROOM, SCHOOL OF BUSINESS LIBRARY

building. On the east and west walls photomurals have been placed; that on the east wall being a map of the island of Manhattan on which are shown the various sites occupied by the college from 1754 to the present time. It is interesting to note that for a short period the college was situated on Wall Street. On the west wall the mural is a reproduction of the "Miniature de l'Hortus Deliciarum" representing Philosophy and the Liberal Arts from a twelfth-century manuscript.

The Butler Library of Philosophy occupies the southwest corner and has a seating capacity of seventy-five. The woodwork is of pine and cherry with bookcases extending from floor to ceiling with a mezzanine gallery all around the room. The ceiling is arched and contains eleven panels with decoration in low relief, the motif being taken from the



BUTLER LIBRARY OF PHILOSOPHY

“Hortus Deliciarum” referred to in the College Reading Room. A translation of the description printed on the mural and which describes the ceiling motif is as follows:

In the center of the composition is seated Philosophy, having on her head a crown from which emerge three human figures, the Ethics or Morals, Physics and Logic. Behind her are represented the sources of knowledge; at her feet Socrates and Plato write, designated by their names at the side of their heads. In a second circle surrounding the first, one sees below under the arches each of the liberal arts; Grammar holding a rule and a book; Rhetoric with the tablets on which they write the discourses; Dialectics having in her hand a dog’s head, a probable allusion to the violence of the discussions over which she presides; Music

with a harp and instruments of music; Arithmetic having a kind of counting machine; Geometry with a compass and a rule; Astronomy contemplating the stars, a bushel in her hands. Below the outer circumference are seated the antique poets each inspired by a bird which represents the spirit of evil. Curious Latin legends celebrating philosophy and commenting on the representations of the liberal arts accompany the drawing.

In this room are hung portraits of President Butler, Dean Woodbridge and Professors Felix Adler and John Dewey.

The northwest corner of the building is occupied by the library of the School of Business with its own delivery desk, work room, librarian's office and stack rooms on the lower floor, reached by a stairway from the delivery desk. The woodwork in the main reading room of this collection is entirely of oak.

Entering the main doorway of the building from the campus level one arrives in the main corridor from which marble stairs lead to the main delivery desk space on the third floor. Directly opposite the entrance door is Mr. Savage's mural. The entrance is finished in Istrian nuage marble with a decorated plaster domed ceiling on which are panels symbolic of the various sciences and schools of the University. Surrounding the center motive is a quotation from Seneca's Epistles—*HOMINES DUM DOCENT, DISCUNT*. (Men while they teach, learn.) This and all other inscriptions and quotations throughout were selected by President Butler. On the floor of the stair landing directly in front of the mural decoration is the following inscription in bronze letters set in the marble,

THIS BUILDING IS THE GIFT OF
EDWARD S. HARKNESS
TO COLUMBIA UNIVERSITY
MDCCCCXXXIV

The northeast corner of the building is occupied by the Modern Language Reading Room, which has a seating capacity of one hundred and twelve and is connected with a special room which is equipped for fifty-six graduate students in research work. The woodwork of the main reading room is of teak.

A part of the east side of the building is given over to class rooms for Columbia College, which at the present time

are used mainly by the Department of French, with the instructors' offices located on the mezzanine.

On the third floor, with access from either of the two stairways from the main entrance, is the Main Delivery Desk which is the heart of the library. At this desk all books are issued and returned and direct communication is maintained with all stacks by means of the electric book lift, the book conveyor and the pneumatic tube system, as well as by telephone.



MAIN DELIVERY DESK

On the walls over the stairs are placed two sixteenth-century tapestries loaned by Miss Emily Buch, in memory of her uncle, Albert Henry Baldwin, of the Class of 1856. Additional tapestries loaned by Miss Buch are hung at each end of the Main Reading Room.

The ceiling of the delivery desk space is of deeply panelled plaster with the seal of the University in the center panel.

The seal is superimposed on ornament; at the base is indicated vegetation and animal life symbolizing botany and biology, while below there is the representation of water indicative of Columbia's location on the banks of the Hud-



MAIN READING ROOM

son. On each side of the seal are represented the torches of knowledge and the oak and laurel standing for strength and victory, while at the two outer ends are seen the skyscrapers of New York. Above the seal is the firmament indicative of Columbia's influence throughout the world.

The grand Main Reading Room, with a ceiling height of thirty-five feet and a seating capacity of three hundred and sixty, is on the front of the building opening from the de-

livery desk space. There are doors at the ends, one to the Periodical Room on the east and to the Reference Room on the west. The bookcases in this room are all in oak. The ceiling is of plaster with ornamental panels and in the four corners are placed the king's crown of the College and the crossed hammers of the School of Mines.

The ceiling contains eighty-eight electric reflectors placed two over each table, casting light down directly on the table surface and these lights are supplemented by a series of indirect reflectors in the top of the bookcases to illuminate

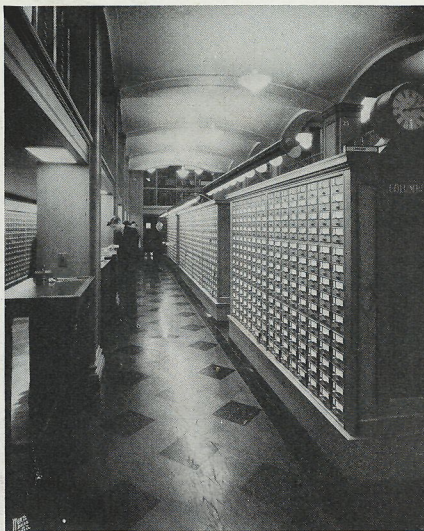


PERIODICAL ROOM

the ceiling. This system of illumination was devised by Dean Joseph Warren Barker of the Engineering Schools. In the frieze of the marble doorway is the inscription *MAGNA VIS VERITAS* from Cicero's oration *Pro Caelio Rufo*, xxvi, and is perhaps the earliest statement of the proverb "Truth is mighty and will prevail." In the plaster frieze at the ceiling is the quotation *A MAN IS BUT WHAT HE KNOWETH* which is

taken from Francis Bacon's essay "In Praise of Knowledge."

The Periodical Room, finished in pine and cherry, occupies the northeast corner of the third floor and has a capacity of approximately thirteen hundred current issues of publica-



CATALOGUE ROOM

tions on the shelves. South of the Periodical Room with its entrance from the east corridor is the Browsing Room of Columbia College. This room has been done in an early American style with all the woodwork of pine, and has a large open wood-burning fireplace. The room is furnished with easy chairs and sofas so the users may enjoy reading the books taken from the shelves.

The general offices of the Library are on the southeast corner, and the offices of the Director of Libraries, the Librarian and the telephone switchboard room. There are two conference rooms adjacent to the offices. The Cataloging Room extends along the south side of the building with direct access to the Catalog and Reference Rooms which occupy the west side of the building.

The Catalog and Reference Rooms are finished in oak and have a mezzanine gallery on two sides. The catalog of



114TH STREET FAÇADE

the Columbia University Library and the depository catalogue of the Library of Congress are housed in cases in the center and on the sides of the room.

The fourth floor of the building is given up to the Brander Matthews Dramatic Library, the Carpenter Library of English, the Greek and Latin Reading Room, the Papyrus

Collection, the Industrial Relations Collection and the Burgess Library of Social Science, History and Economics. There are in all six seminar rooms and four rooms for the special use of graduate students on this floor.

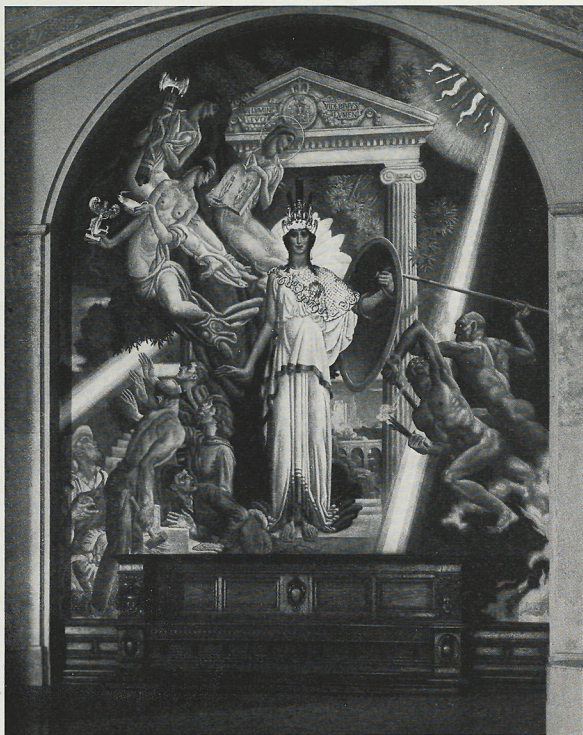
The fifth and sixth floors are devoted to the work of the School of Library Service and are equipped with administrative offices, work rooms, classrooms and faculty offices. There is a special Reading Room and Reference Room for the school on the sixth floor with its own delivery desk, librarian's office and direct communication with the main delivery desk by pneumatic tube.

The seventh, eighth and ninth floors are occupied entirely by stacks and small private studies on the exterior walls, which are assigned to members of the faculties for study and research. The fan rooms, elevator machinery, etc., are on the eighth floor.

The building does not house all the collections of the University Library. The libraries of the School of Architecture, the Law School, the Medical School, the School of Journalism and the departmental libraries of fine arts, psychology, natural sciences, chemistry, physics and engineering remain in their respective buildings, and the Eastern Asiatic Collection, consisting of the Chinese, the Japanese and the Korean books, the Rare Book Collection, the Columbian Collection and the Mathematical Library are housed in the Low Memorial Library building.



REFERENCE ROOM



THE SOUTH HALL MURAL

THE SOUTH HALL MURAL

EUGENE SAVAGE, N.A.

The subject matter for a mural painting cannot be undertaken lightly when it is to occupy a prominent place in a university. The thought expressed must be above the fads and fancies of a decade and have a basis of permanence and timelessness as have the eternal verities themselves.

Had we to dispose of a series of spaces not too monumental in location it would be possible, even desirable, to go lightly contemporary, morbid and iconoclastic, or gay, and ride hard the hobbies and the fancies. The space in question, however, located in the beautiful new library, South Hall, on the main axis at Columbia University, would admit of none of these. The building is a library and I would have welcomed the opportunity to paint in praise of books, the most boundless and vital expression of human experience and hope. To detract from books and scholarship is casuistry and sophistication at its worst, a sulking underestimation of the fullness of life itself and of the possibilities of excellence in all things. But the importance of the space went beyond reference solely to the library, it must necessarily represent the University rather than an integral part. It must necessarily stress its function, giving due emphasis to the particular character for which Columbia University is well known.

Important elements in that function would be to inform, to impart traditions of thought and prepare youth for independent thinking and thus coördinate the past and present with the future. The guiding spirits of Columbia have outstandingly pointed the way in the important fields of human endeavor, inspired higher standards and identified evil with its source and courageously resisted that evil. She has well earned and followed her motto, *In Lumine Tuo Videbimus Lumen*.

No subject matter could deal with more vital things nor is drama absent in what goes forward.

A beam of light separates obscurity from evident and tangible things, be the source of that light what you will, it separates ignorance from enlightenment. It points out the

way "to those who sacrifice and stumble and aspire" to gain the heights.

The group of figures in the lower left of the painting are struggling upward from thorny and difficult paths, confused in direction and circumstance as to how they shall apply hand and brain and escape the chaos and suffering that could engulf them. Agricultural and industrial labor dominate the group which is led upward by three figures in the upper left section bearing symbols of the four major phases of human effort, Law, Religion, Art and Science, historically the guiding spirits of progress. These two groups proceed under the protecting hand of Columbia, represented by her prototype, Athena, who directs their steps as she stands in the center of the composition holding high her shield in opposition to the spirits of malignant ignorance and greed, who rise from the black on the right and direct at her head their shafts and fire in an effort to overwhelm the scene. That the issue between these opposing forces rests in the balance in the mural painting may in time be viewed, as of our own time, a true contemporary point of view of the chances for Peace, for there it stands today.

Well used peace is the underlying premise of all progress and well being, it overhangs everything in the mural painting with the motive of the olive tree, back of the portal, sacred to Athena and our symbol of Peace. It seems to be the recent almost universal lapse from peace and its resultant ideological and economic demoralization that is now successfully challenging all previously well-ordered thinking and traditional philosophical conclusions. Such is the thought of the subject matter.

Plastically the painting was intended by the architect to dominate the entrance hall, and so it does. Besides its axial location, the scale, color and pattern are managed to insure dominance, aided in this instance by gold leaf enrichment in relief. Scale is little understood by many, perhaps because there are no rules to apply. I once heard Mr. Kenyon Cox try for a rule when he said "figures should never appear to be over life size." The statement cannot stand when examined in the light of Egyptian, Asiatic or Byzantine experience, but only from the standpoint of the period in which Mr.

Cox worked and spoke so ably, the late Renaissance, is there truth in what he said.

Figures or objects painted on a wall or in a picture thereon measure a wall and decide its size and the size of the interior. It is a flexible measure; large walls can lose their size, small interiors can become relatively larger by the management of that measure, therefore we have scale and it is a fundamentally important consideration. It is interesting to note here that in Byzantine and early Asiatic or Egyptian work, two scales of figures are frequently used on the same wall, forty-foot figures taking the dominance while five- or six-foot scale the wall, the contrast yielding pattern and leverage not otherwise to be had. It seemed best in the South Hall mural painting to have the figures of life size, the Athena figure slightly larger, with a distant view of Manhattan in small pattern to give the rest of the composition more comparative scale.

The longest line in the composition is the beam of light which is balanced by the lines of the hovering figures in the upper left, and the line of evil spirits continued athwart the beam of light. The opposition of these two lines forms an adequate counterpoint to the semicircular top to the composition. The line made by the hovering figures and that of the evil spirits required opposition in the lower left and this is supplied by the figure of labor, with the hammer, who leans forward in sympathy and interest for the climbing figures in his group.

The form description and relief given the figures and other elements, is simple and rounded, usually with one transition from light to dark, in harmony with the rounded forms and degree of relief of the classical Renaissance style of the building. The space was not the occasion to follow that section of critical persuasion that calls for subversive subject matter done with modernistic experiments in the manner of the prevailing fad of the month; it would desecrate the premises.

Columbia has reason to rejoice that the architect, Mr. James Gamble Rogers, had the taste and vision to conform to the campus and build beautifully and harmoniously with the University as far as it has been developed.



BROWSING ROOM

THE HEATING, VENTILATING AND AIR CONDITIONING OF SOUTH HALL

CHARLES ARTHUR KING '05 MECH.E.

Before entering upon a description of the heating, ventilating and air conditioning equipment of South Hall, it would be clearer to the reader if he had a mental picture of the general interior arrangement of the building. The building proper has six floors above ground and a basement and sub-basement and in the heart of the building is the bookstack extending from the basement level to the roof with fifteen floor levels of a height of approximately seven feet each. The stack space therefore has no outside exposure except the roof over the fifteenth floor; it is practically a building within a building.

Steam for the heating system, hot water heaters and air tempering is supplied from the University power plant at a pressure of approximately one hundred and twenty-five pounds and then is reduced in pressure to two pounds for all services by means of pressure-reducing valves in South Hall.

The heating is accomplished by a two-pipe steam vacuum return system with cast iron radiators either exposed or concealed according to the architectural treatment of the room with automatic control of the heat sources in all the larger and more important rooms. The bookstack space has no radiation except coils on the fifteenth floor ceiling level to take care of the roof transmission. The electrically driven turbine type vacuum pumps in the sub-basement receive the condensation from all services and return it to the power house.

Ordinary ventilation, that is without air conditioning, has been provided for all rooms where it was considered ventilation would be necessary. There are two main ordinary ventilating systems, one ventilating rooms from the basement to the second floor, and the other rooms from the third to the fifth floors. In each system there is a blower drawing air from outdoors through air filters of a highly efficient paper type, thus thoroughly cleaning the air and then delivering it to the various rooms. During the winter season this air

is heated to approximately room temperature by passing it through cast iron tempering stacks automatically controlled. The thermostat is located in the discharge duct from the blower and opens or closes the steam supply valve to the tempering stacks so as to keep the temperature of the air within one degree of that desired. The heating of the building is entirely taken care of by the direct radiators, and in no way by the ventilating systems.

There is an exhaust fan on each system which withdraws the air from the ventilated rooms and discharges it through the roof. The speed of the blower and exhauster motors can be manually increased or decreased so that the volume of air moved can be adjusted to meet changing seasonal requirements. The number of times the air is changed per hour in the various rooms varies according to the use of the room, the density of its population, the heat given off from the lighting and other factors.

Besides the two main ventilating systems there is a fan exhausting air from all toilets, a fan exhausting air from the pump room and photostat rooms, one for the motion picture booth and one from the room in the sub-basement in which the refrigerating apparatus is located. There are other exhausters withdrawing air from the tunnels in which the steam piping is run.

There are two parts of the building where study showed that ordinary ventilation would not maintain reasonably comfortable conditions. One is the theater which is in the basement with a seating capacity of a little less than three hundred people; and the other the bookstack space.

It was stated by the University authorities that the bookstacks were to be used during the summer time and it was planned that a very considerable number of students would occupy desks along the walls, working under artificial light. It was also known that the theater would be used during the summer time. It became at once apparent that no amount of ordinary ventilation could maintain reasonable temperatures in either the stack or the theater for the heat given off by the people and the lights in both of these parts of the building would so increase the temperatures of the air passing through these parts that the resulting high temperatures could not

be endured, especially when the outside temperature was excessively high.

The only solution to the problem was in the use of conditioned air introduced into these two parts of the building at temperatures considerably below the outside temperature to compensate for the "heat gain" due to people and lights. For this reason air conditioning was provided for the theater and the bookstack.

The refrigerating plant is of the compression type using Freon as the refrigerant.

There are three air conditioning systems, one for the theater, a second for the basement to the eighth floor of the stack space and the third for the ninth to fifteenth floors of the stack space. On each of these systems it is possible to dehumidify and cool the air in the summer season and warm and humidify the air during the winter season. A constant relative humidity of fifty per cent can be maintained in summer and forty per cent in winter; and when it is 90° outdoors 80° can be maintained indoors, this being considered about the maximum temperature difference for health and comfort. There is an outdoor air intake and a paper type filter for cleaning the air for each system, also an air washer for cooling and dehumidifying the air in summer and humidifying it in winter, radiation surfaces for heating the air in winter and a blower for delivering the air to the ventilated spaces. There is also an exhaustor for each system for withdrawing the air from the ventilated spaces and discharging part of it outdoors and part back to the suction side of the blower for each air conditioning system so that it is possible to recirculate a part of the air with consequent saving in operating expense. All the air conditioning systems are under full automatic control, which means that for a desired indoor temperature and relative humidity both summer and winter the automatic system will maintain these conditions with both changing outdoor and indoor conditions.

The air is conditioned in the summer season by passing it through a finely atomized spray of chilled water within the air washer. The dehumidifying is accomplished by lowering the temperature of the chilled water sufficiently to reduce the

temperature of the incoming air below its dew point, or the temperature at which it is saturated, thus extracting or condensing sufficient moisture out of the air to maintain the desired relative humidity in the ventilated spaces. After leaving the washer the air is raised in temperature to the desired temperature for delivery to the room by mixing with it, at the intake to the blower, a certain quantity of air returned by the exhausters.

The water is chilled by passing it through a water cooler, the water being in the shell and the refrigerant in the tubes. There is a pump on the chilled water system which supplies the water under pressure to the atomizing sprays in the washer and returns it from the washer to the cooler.

In the winter season the refrigerating plant is shut down and the air is heated and moisture added to it by passing it through an atomized spray of water in the air washer in order to obtain a relative humidity in the ventilated spaces of about forty per cent.

The method of introducing the conditioned air into the rooms is of interest. In an ordinary ventilating system the supply air enters the rooms at approximately room temperature whereas in an air conditioning system the air enters at a temperature considerably below the room temperature depending upon the heat load in the space ventilated. Therefore great care must be given as to the type and location of conditioned air supply outlets in order to avoid cold drafts upon the occupants of these spaces. In the theater the air is supplied through sixteen ceiling outlets, there being a solid plaque suspended a few inches beneath each outlet so that the air is thoroughly diffused and the velocity of its movement reduced before it reaches the lower or occupied part of the room.

The introduction of conditioned air to the stack space was a difficult matter owing to the very low headroom of about seven feet on each level, but it was successfully worked out in the following manner.

The stack space was designed with a double wall with a clear vertical space of about ten inches between the walls. The walls were insulated with cork to prevent heat transmission. These wall spaces are used as plenum spaces into which the blowers deliver the conditioned air.

The bookstacks run north and south across the short dimension of the stack space and at the end of each aisle between the book stacks there is a slot-like opening through the inner wall to the above-mentioned conditioned air supply plenum space. These openings are two inches high and located close to the ceiling above the head line with a horizontal metal vane in the center to deflect the air slightly upwards to the ceiling. The distribution of the air by this method proved on a test to be remarkably uniform throughout all the stack levels. The temperature and relative humidity was practically constant and uniform throughout.

The air is exhausted from each stack level through a series of outlets located along the center aisle which runs lengthwise of the stack space. The large vertical exhaust flues are a part of the stack structure and extend from the basement to the fifteenth level ceiling where they are connected by a duct system to an exhaust fan. The exhauster discharges this air in part to the outdoors, the remainder being returned to the air conditioning system in the sub-basement as recirculated air. The amount of air wasted and returned is automatically proportioned from the control system on the air conditioner in the sub-basement by means of motor operated dampers in the two discharge ducts from the exhauster.

The heating, ventilating and air conditioning equipment was designed by Meyer, Strong and Jones, Inc., Consulting Engineers, with the author in charge of the work.

SOUTH HALL, AN EXPERIMENT IN ARTIFICIAL ILLUMINATION

ROBERT W. JEFFERY

In creating a building an architect has a dual problem. He must create an edifice which is pleasing to the eye and he must design a structure which may be used fully for the purposes for which it is intended. The primary function of a library is to enable the students to use effectively the material stored within it. In order that this purpose may be accomplished, it should be possible, first, for the student to find his desired material easily and second, to be able to peruse this material readily. This generally involves an extended amount of reading which may be a severe strain on the eyes, particularly if the print is not readily legible.

Recent studies and surveys by eye specialists and vision experts have shown that eye defects increase at an alarming rate with age. One rather complete survey (by the Better Vision Institute) reveals the following startling facts:

<i>Age</i>	<i>Percent defective vision</i>
20	23
30	39
40	48
50	71
60	82
70	95

Another eye specialist has stated this another way:

During elementary school periods nearsightedness begins to appear and this defect increases throughout intermediate school and college. There can be little doubt that this defect is largely the result of use and abuse of the eyes. Later in life the increase of farsightedness with advancing age tends to overcome the nearsightedness.

Increase in the severity of visual tasks with advancing age throughout school is attributable in larger part to this increasing prevalence of eye defects. Not long after a child enters school, demands on his eyes become more severe by their being more exacting and prolonged. Although much progress has been made in printing school books and in the day lighting of classrooms, much remains to be done toward improving artificial lighting for dark days.

Librarians are acutely aware that there have been some

fundamental misapprehensions in the present application of lighting in libraries. Fully ninety-five percent of the tasks are of sustained vision, usually over very long periods of time. Very meager and unnatural illumination seems to be the rule. Such poor lighting conditions require an expenditure of energy approaching the point of exhaustion. Records of life insurance companies indicate that the depletion of nervous energy is going on at an alarming rate in our present-day life. These records show that strain, shock, noise and unnatural seeing conditions are the contributing factors toward this insidious deterioration.

The architect for the South Hall Library at Columbia University, Mr. James Gamble Rogers, has recognized these problems and has attempted to provide lighting for seeing. He has realized that a library, to be of maximum value, must have a lighting system which will simplify the external visual tasks and reduce the internal costs of seeing (drain on nervous energy). Mr. Rogers was glad to subordinate decorative expression and to modify the forms of working rooms for humanitarian considerations which made possible this notable experiment in improving visual conditions.

It is only within the past few months that Dr. Luckiesh, and Messrs. Hibben and Moss, in their studies of light and vision, have found some startling facts from which they have developed the science of seeing. These studies have provided the tie-in between light and vision, so lacking in the past. They have shown that the eyes are able to compensate for severe or unnatural visual conditions, but in so doing they are eventually injured.

The human eye has evolved through time in an abundance of natural diffused light of the out-of-doors. The light came from the extended, vaulted, luminous sky with a relatively dark green (trees, grass, etc.) contrasting, visual field below the horizon. This natural condition is quite different from that which we have been providing for our interiors. We have been attempting to illuminate our rooms from bright spots of light. The science of seeing has further shown us that the intensities of illumination out-of-doors to which the eye has been accustomed, are far greater than those with which we are attempting to work indoors. Therefore, for

proper conservation of eyesight, for general health, and for an elimination of physical and nervous fatigue, much higher levels of illumination are desirable. This lighting should come from extended luminous surfaces such as we have for ceilings in our rooms.

Mr. George Ainsworth of New York, consulting engineer on illumination, was employed to design and manufacture lighting equipment which would embody, as far as possible, these new principles of clear seeing. Mr. Ainsworth's problem was to devise a system which would begin to approach the quality (light from an extended lighted area, the ceiling) and quantity of the out-of-doors seeing conditions. His problem also was to provide illumination not for an individual working at one point within the room, but to provide lighting for a number of individuals or a group or groups of individuals working at various points in the room. Since economic factors prohibit the quantity of light from being equal to the out-of-doors, compromises were necessary. Thus, the lighting system at South Hall can properly be called an experiment in artificial illumination which is vastly superior to what has been provided in the past.

The Maglalux fixture, which was used in this building has a very heavy dense opal glass bowl with a very high reflection factor. This bowl shades the rays of light of the lamp from the eyes of the person in the room and redirects these rays to the ceiling. The ceiling which is lighted then acts as the "sky" and diffuses the light throughout the room. A small percentage of light is transmitted through the bowl, making the bowl luminous so it shows up neither as an opaque object silhouetted against the ceiling nor as a bright bowl having a contrasting brightness with the ceiling. These bowls are suspended from the ceiling with a very small, neat stem with a polished finish which tends to make them invisible. They are suspended at heights to give uniform lighting over the working area of the room. An interesting by-product of the experiment at Columbia is an increased utilization of the lumen output (efficiency) of the Mazda lamps. This experiment in illumination, therefore, demonstrates the most economical means of providing the many study and

laboratory rooms in the library with lighting, which in effect, amounts to labor-saving devices.

Severe or unnatural seeing conditions create a drain on the physical and nervous energy of a person. Everyone is familiar with the difficulty of discrimination of details when a train passes through a series of tunnels or when an automobile is driven along a road where the sunlight filters through the trees across the line of vision. This same thing is also true, to a lesser extent, in passing through the corridors, passages and stairways at South Hall which are not provided with the same quality or intensities of illumination as provided in the study rooms. This non-uniformity of lighting is a concession to architectural interest. No attempt was made to bring this scientific lighting into the circulation about the building, but it is true there would be less ocular fatigue if this could be done.

Cherished architectural forms and systems of design and decoration have come out of our historical background through, and even beyond, the Dark Ages. These are expressions of accepted standards of culture. A library has always been an edifice where a maximum of these inherited architectural motifs were used. The architect for South Hall was glad to coöperate with the illuminating engineer and to modify historical design where it was not suitable in order to gain clear and easy vision, particularly in the reading rooms, which are used by students over extended periods of time. The architect was glad to sacrifice design when it was seen that historical ornament prevented the building from best serving its purpose.

The architect was quite willing to discard much of the historical ornamentation on the lighting fixtures themselves. The means of artificial illumination has been in the hands of metal workers since the discovery that tallow and oil in metal utensils were useful for lighting after dark. Brass mongers and metal artisans, mainly desiring to reproduce historical ornament, or in the last few years to express themselves in its antithesis, have created the equipment that has lighted the student through his nightly stint. They have been reproducing fixtures which were originally designed for oil

flames; they have even retained the cup to catch the oil drippings and have used it with present-day electric lights! Mechanical and electrical technicians have devised all manner of reflectors and intensifiers of light; yet these devices have been used by designers striving for medieval effects. This has resulted in startling and harmful brightness contrasts to which our eyes have never become accustomed in our libraries and other monumental types of structures.

Mr. Ainsworth has employed these historical ornamentations to a very moderate extent, and to what may seem to be an after-thought. His primary conceptions have been to provide proper illumination; and after these fixtures were designed for that purpose, to work in sufficient ornamentation to tie the fixture properly to the location where it was used. He employed a basin of shallow cone shape for general appearance, but hyperbolic in shape on the inner surface; this hyperbolic surface gives the maximum spread to the upward light. He used a narrow stem to support the fixture, a ring design on the outside of the basin to tie it into the design of the room and to increase the thickness of the glass at the area of the bowl closest to the lamp. One school of thought would say that this is false from a historical point of view; the other school of thought would say that this is correct because it is logical and it is what the ancients would have done to illuminate properly a similar building should they have started with an electric lamp instead of an oil or tallow light source of their day. These are two radically different schools of thought and they may provoke considerable debate on the experiment in lighting at South Hall.

Much new knowledge is still needed on the subject of light and vision, but it is now possible to demonstrate a sound beginning in the *Science of Clear Seeing Without Fatigue*. Normal vision is being helped and preserved. The forty percent of the students with impaired vision are being assisted to a very great extent. While the oculists, ophthalmologists, and opticians have given mechanical assistance to enlarge and clarify the image, new means of light distribution and sympathetically disposed architecture and painting are controllable factors which give psycho-physiological assistance

in a major way. South Hall Library is offered as an example of what can be done today in the way of economic "lighting for seeing."

This accomplishment was made possible by the encouragement and willingness of President Butler to permit the architect to depart from precedent and by the understanding coöperation given by Dr. Williamson and Dean Barker in a difficult and constructive experiment which will surely lead to the improvement of library lighting throughout the country.



THE BOOKSTACKS

ANGUS SNEAD MACDONALD '05 ARCHITECTURE

In 1909 a prophecy highly important to the library world was made before the American Association for the Advancement of Science by Bernard R. Green, constructor of the Library of Congress. Up to that time natural lighting for all rooms in a library, including the stack room, had been considered essential, and the freedom of planning for convenience and economy correspondingly limited. But this far-seeing engineer spoke of "A Library Bookstack in the Dark" and foretold the time when libraries would be planned for stacking books in space free from the insidious destruction caused by sunlight and, being without outside windows, not in demand for other purposes. In 1913 the Multnomah County (now Portland, Oregon) Public Library was built with just such a stack occupying central space which might otherwise have been an obtrusive light court. The acclamation which this building received was in good part due to the convenience and compactness of its plan, wherein all rooms have direct access to the book store. In 1930 the Yale Library was completed, containing a core-like stack entirely without windows until it emerged above the roofs of the surrounding wings at the eighth tier level and continued upward for eight more tiers as a book tower, with all the window wall space devoted to study carrels. And now comes Columbia with a great library built around a laboratory bookstack, the largest bookstack ever constructed as a single unit. In this type of plan, economy of construction is promoted, as well as compactness and convenience, as the cost of housing such a stack is practically *nil*. This is due to the fact that with a large windowless central stack a building can be planned without interior or exterior light courts and a great amount of exterior wall construction saved.

The Columbia stack is an independent structural unit, self-supporting throughout its fifteen tiers and carrying its own roof. To plan for the latter function a new interpretation of the rigid New York City building law was procured, to the effect that unfireproofed steel stack columns may be used as roof supports in a library bookstack, as it is a special

purpose, non-commercial structure. The present stack roof (minus insulation and waterproofing) will eventually be the deck floor for the sixteenth tier as the stack structure is designed for a four tier top extension.

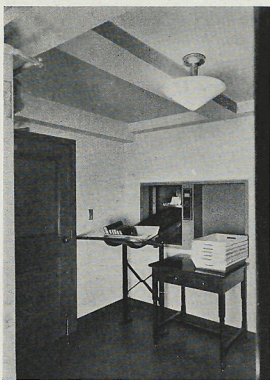
In plan this stack room is of constant length but of varying width as in each story the stack area is expanded northward as much as possible to include all space not required for other purposes. Each stack tier is seven feet six inches high and all main floors line up with a stack deck floor. The stack columns are uniformly spaced three feet apart in the direction of the ranges and four feet four inches apart between centers of ranges except where main aisles intersect. This four feet four inch spacing allows the use of shelves as wide as twelve inches anywhere without making the aisles too narrow. The deck floors are of continuous slab construction three and one-half inches thick and perfectly smooth and flat on both faces. The undersides of the slabs are painted a light cream color to form a light reflecting ceiling and the top sides are tiled with asphalt to give a quiet walking surface.

General access to and egress from the stack is under control at the delivery desk and in the center immediately adjacent to this entrance are two vertical runs of enclosed stairs and two automatic elevators, one for service and one for readers. Two shafts, now empty, will take care of additional elevators when the four-tier top extension is added, or even before, if the use of the library demands them. In each tier near the crossing of the spacious longitudinal and transverse main corridors there is a stack attendant's desk and control station. Here are grouped the book conveyor, elec-



TYPICAL STACK DECK CONTROL STATION
WITH NEST OF BOOK-DISPATCHING
TRAYS

tric booklift and pneumatic tube terminal, so that the stack attendant can conveniently serve the delivery desk and at the same time observe what is going on at his level. At this time there are attendants in the third tier, second floor level; sixth tier, third floor (delivery desk) level; eighth tier, fourth floor level; and tenth tier, fifth floor level. Each attendant takes care of two or three tiers. The upper tiers, being as yet largely unoccupied, are unattended. Readers can enter and leave the stack room at the delivery desk, at two points on the fourth floor which are controlled by de-



DELIVERY DESK STATION OF CONVEYOR
WITH GRAVITY DISCHARGE

partment desks and through the School of Library Service library on the sixth floor. Exit doors are provided at each of the main floor levels in order to conform to fire department regulations.

Probably in no great library in the world are readers supplied with books from the stack more promptly and conveniently than at Columbia. When a call-slip is received at the desk it is shot by way of a one and one-half inch diameter pneumatic tube to the proper stack control station. The attendant there dispatches the corresponding book in a tray via the book conveyor and when

it reaches the delivery desk station it is automatically unloaded. The weight of the tray on the unloading rails lights a signal visible at the delivery desk so that it may be promptly removed. However, if four trays collect on the unloading rails the conveyor will be automatically stopped before the next tray arrives. Safety devices at each conveyor shaft opening also provide for instant automatic stoppage in case of accident. The arrival of the book at the delivery desk is signaled on the electric annunciator board and the reader can leave for his seat with his book in from two to five minutes'

time after turning in his call-slip. Prompt service is aided by a line of red signal lights running the length of the main stack aisle in each tier and located opposite the end of each range aisle. These indicate to the stack attendant that the pneumatic tube has delivered a call-slip requiring his attention. The electric dumbwaiter located adjacent to the conveyor is used for the dispatch of books oversize for the con-



MAIN TRANSVERSE STACK AISLE SHOWING CONTINUOUS BEAMLESS
CEILING AND TILE COVERED FLOOR

veyor (larger than eleven inches by seventeen inches) from the stack stations and the return of the conveyor trays to the stack stations.

The stack equipment has been planned with a large amount of elasticity in order that it may properly meet laboratory requirements. Similar parts are interchangeable throughout the entire stack structure and provision can be made anywhere in the stack for readers or the work of the library staff, as well as for book storage. The deck floors with their asphalt tile walking surfaces are continuous over the



INTERCHANGEABLE "SHUT-OFF" PANELS;
STORAGE ACCOMMODATIONS FOR
SURPLUS SHELVES



STACK STUDY UNIT



BOOK SORTING SHELVES WITH SLOPING
BACKS AND BOTTOMS



MOVABLE STUDY SHELVES ALONG CENTRAL
TRANSVERSE AISLE

whole stack area, including space under ranges, as well as aisles. All shelves are of the open bar type with hinged end brackets, permitting relocation without unloading the books and the easy clearing of any compartment to form an auxiliary aisle or space for reading. Surplus shelves with brackets folded down flat can be compactly stored away on storage shelves having underslung brackets. Other special shelves, sloping downward toward the back and having backs equaling in height the fixed end brackets, are used for sorting books ready for return to the shelves where they belong. Readers' consultation desks having heavy underslung brackets and linoleum working surfaces can be used in any compartment in place of the lower rows of book shelves. Provision has been made within the stack for the work of several hundred students (426 at present) by providing movable study units extending across the side aisles between the ends of the book ranges and the stack room walls. Where these study units are used supplementary side aisles are made by removing the shelves from the adjacent end compartments.

In order to make provision for special gifts or groups of books that must be kept together, a row of Special Collection rooms was built into the stack structure in the sixth story. These rooms extend along the south side of the stack room from end to end and each occupies the height of two stack tiers, the twelfth and thirteenth. Down the center of each room there is space for reading tables and the walls are lined with shelving for the full height of fourteen feet eight inches. A suspended gallery reached by a short, steep flight of stairs provides access to the upper shelves. These Special Collection rooms



SPECIAL COLLECTION ROOM

have doors in their ends at both levels so that two or more rooms can be operated as one unit. Any amount of additional storage space for books belonging to a special collection can be set aside by enclosing a portion of the adjacent stack space with wire mesh partitions.

In every large university there is an insatiable demand on the part of the teaching staff for private working space close to the books needed in the library. This demand has

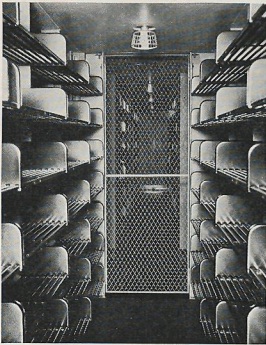


TYPICAL PROFESSOR'S STUDY

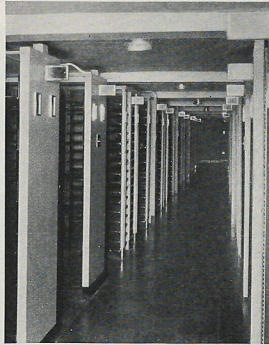
been met in part at Columbia by providing one hundred and eighty-four professors' studies, seven conference rooms and two typewriter rooms which occupy a large portion of the periphery of that part of the stack which projects above the roof of the main building. These studies line up with the twelfth, thirteenth, fourteenth and fifteenth stack tiers and are separated from the stack itself by continuous corridors and thin flush steel walls. The studies range in size from six feet wide by four feet seven inches deep, the smallest, to six feet nine inches wide by ten feet four inches deep, the largest. The

usual equipment consists of a desk, chair, filing cabinet, bookcase and typewriter stand. There is also a small radiator, a window and electric fixture so that the occupant can control his own conditions as to heat, ventilation and light. The studies are formed by movable, three inch thick, flush steel partitions, insulated to reduce the transmission of sound and provided with burlapped upper panels to cut down sound reverberation. In order that the occupants may work undisturbed the studies are not equipped with telephones nor arranged to receive visitors.

Wire mesh panels fitting interchangeably between the stack columns along the centers of the ranges and across the aisles make it possible to shut off any portion of a stack tier to take care of books withdrawn from general circulation or reserved for a special department. Some of the aisle panel units are provided with lockable doors. All panels are readily interchangeable and are secured in place by hooks and bolts inaccessible to any one outside an enclosure.



HINGED OPENBAR SHELVES AND INTER-
CHANGEABLE WIRE MESH "SHUT-
OFF" PANEL



NEWSPAPER STACK LOOKING DOWN
MAIN AISLE

Interchangeability of partitions, shelves and other fittings necessitates great accuracy in the dimensions of all parts, fixed as well as movable. The thoroughness with which this requirement was carried out was graphically demonstrated during the course of construction as it was possible to sight a lighted match ninety feet away on the far side of the stack room through the lines of $5/16$ " bolt holes in successive rows of stack columns.

As bound newspaper volumes are not efficiently stored in a bookstack designed for shelving octavo and quarto books, it was fortunate that space for a separate newspaper stack room could be set aside in the first story of South Hall

just to the north of and immediately adjacent to the main stack. This space accommodates a two-tier stack with a continuous concrete slab deck floor. Owing to the fact that there were main building columns and overhead floor beams in the stack area it was necessary to vary the spacing of the newspaper stack ranges and the length and height of the shelf compartments in order to coördinate the stack with these existing conditions. The typical shelves are, therefore, a little shorter than usual, being two feet two and one-half inches



SMALL TWO-TIER STACK FOR DELIVERY
ROOM OF SCHOOL OF BUSINESS
LIBRARY

long and eighteen inches deep. The compartments are seven feet six inches high in the first tier and six feet six inches high in the second tier. Not including space reserved for future expansion there are existing accommodations for 17,967 newspaper shelves, or allowing two volumes per shelf, 35,934 bound newspaper volumes. The shelves are of open bar construction supported at the back corners by adjustment strips attached to the stack columns and at the front corners on cast iron shelf supports resting on the floor.

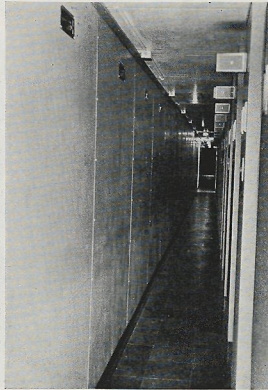
In addition to the main stack and newspaper stack there are also six two-tier smaller bookstacks in other portions of the building. Two of these occupy dark space in the first story at the ends of the newspaper stack room and the other four are found in connection with special reading rooms in the second and fourth stories where it is necessary to concentrate quantities of books on small areas. All of these stacks are the same bracket type with closed ends and open bar shelves as in the main stack.

Throughout all stacks the electric light conduits and outlet boxes are buried out of the way and out of sight in the deck floors. The stack aisle light reflectors are made of aluminum

having an anodic oxide silver-like finish to give a highly efficient light reflecting surface. This light-reflecting surface is shaped and perforated so as to reduce and more evenly distribute the amount of light falling on the upper rows of books, which are ordinarily too intensely illuminated, and at the same time increase the light on the lower rows.



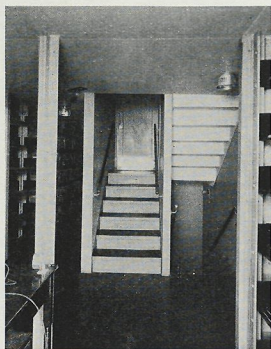
STACK AISLE LIGHT REFLECTORS



STEEL WALLS WITH REGISTERS COVERING
PLENUM SPACE FOR CONDITIONED AIR

In a windowless central stack such as Columbia's, the heating and ventilating problem takes on a special aspect. As the rows of rooms surrounding the stack in all stories protect it from loss of heat, no heating is necessary except that required to bring the fresh air taken in from outside up to the desired temperature. On the other hand, the heat given off by the human occupants and electric lights would tend to build up excessive temperatures if some means for cooling were not available. Consequently, full air conditioning has been resorted to. Fresh air is taken in at the roof and drawn down into the basement through a large metal duct in the southwest corner of the stack room. Here it is filtered,

humidified and brought to the desired temperature by heating during cold weather and refrigerating during warm weather. Next it is forced up through narrow plenum spaces formed between the rough brick curtain walls extending from one building column to another and the insulated flush steel stack walls which run continuously from end to end of the room just in front of the building columns. Registers in openings in these walls just opposite the stack aisles are



STACK STAIRS WITH "AIR VALVE"
DOORS AT LANDING

permanently set to control the amount of conditioned air passing into each tier. The air is exhausted through small ducts located along the main longitudinal aisle and occupying the space of an end compartment in each third range. The air in each stack tier is changed four times an hour and handled independently from the other tiers. On that account the stair landings are provided with double swing "air valve" doors. This air conditioning system makes the atmospheric conditions practically ideal for the workers in the stack. It should also

save greatly in the expense of cleaning floors, stacks and books and by keeping the proper amount of moisture in the book materials promote their long life. When due weight is given to this saving in maintenance expense the equipment for full air conditioning can be considered a necessary economy rather than a costly luxury.

Means for indefinitely expanding book storage capacity is important for every large permanent library building. At Columbia it has been provided for in part by designing the stack structure so that it is capable of carrying four additional tiers. Then whenever necessary additional stacks can be built under the athletic field immediately to the north of

the library which has potential capacity for many millions of volumes. With what is usually the most difficult problem, expansion, taken care of, Columbia's Library promises to maintain efficiency through a long life.

STATISTICAL DATA

		Main book-stack	Other book-stacks	Newspaper stack	Total
Contents in cubic feet		1,178,000	63,000	89,000	1,330,000
Area of Stack	Sq. ft.	156,429	8,390	11,897	176,716
Deck floors	Acres	3.6	.2	.3	4.0
Length of	Lin. ft.	31,290	1,876	2,059	35,225
Stack Aisles	Miles	6.0	.4	.4	6.8
Number of Shelves		109,733	5,719	17,967	133,419
Length of	Lin. ft.	329,199	17,450	40,688	387,337
Shelving	Miles	62.4	3.30	7.7	73.4
Cubook ¹		1,574,300	87,500	35,934 vols.	1,697,734

All stacks and stack equipment, stack aisle light reflectors and book conveyor were furnished by Sned & Co. of Jersey City, New Jersey.

¹ See article by Robert W. Henderson in *Library Journal*, 15 November, 1934.

MOVING THE COLUMBIA UNIVERSITY LIBRARY

HELEN HAY YERKES

Moving a library of some million volumes isn't nearly so bad as it sounds. Only three things are of paramount importance: first, *How to move*; second, *What to move*; and third, *What to move where*.

In our case several obstacles presented themselves which were overcome in a manner highly creditable to an ingenious idea on the part of our librarian and the Department of Buildings and Grounds. It was a stroke of luck to remember that there were several hundred roller shelves stored away in the basement and a test of craftsmanship to be able to turn out a most successful chute, which overcame one obstacle, the broad flight of steps from Alma Mater to the street nearly a block away. This proved of interest to every passerby and an envy to every child.

It had been clear to many of us that if we were to accomplish our moving in the short period between the summer and fall sessions we would have to transport from at least three points at one time. This required no mental somersaults, for the old building had more than that many doors and windows, three of which could be used at the same time without conflict. In the absence of inside elevators two hoists were set up on the front of the building at the east and west ends with platforms at the third and fourth floor windows. From the second floor an adjustable chute went from other windows on to a low table on the ground. Inside the building adjustable chutes were used from mezzanine to floor.

Now that the mechanics of the thing were settled we were still north of 116th Street. How to move remained a question, but not for long as our librarian is a creative dynamo. A column of figures and the application of the rule of division soon had about twelve professional movers and sixty-five college men set around at strategic places along the line of action. Six hundred boxes, eight trucks and thirty dollies completed the equipment.

Mr. Howson's plan of dividing the men worked admirably,

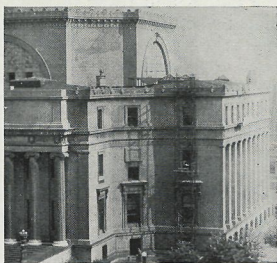
and in order to keep the men both useful and happy they were occasionally shifted from indoor to outdoor work and vice versa.

The boxes in which the books were moved were each three feet long, twelve inches wide and eight inches high with an extension in each corner so that they could be stacked without damaging the books. Each box contained from twenty-five to thirty volumes. Box numbers were printed on long grey cards and ran consecutively from 1 to 999. Those printed in red numbers were to go in the main or north entrance, those in green to the east chute, and those in black to the west chute. Boxes were piled five high with numbers running consecutively, the highest number on the bottom. From the shelves they were pushed on a dolly to the point of exit and there placed on a truck, in five rows of three boxes each, and hauled to the head of the chute. At the foot of the chute they went on to another truck and were pushed across the athletic field to the main entrance of South Hall which was the parting of the ways for the red, the green and the black.

The stacks in the new building are an interior pile of fifteen tiers in a six-story building, not all of them opening on a corridor floor. Our first plan was to send books to stacks opening on a corridor floor, namely 3, 6, 8, 10 and 12, on east and west elevators directly to the floor, the others to be routed from the Main Reading Room by stack elevators to their designated tiers. Experience soon taught us that basically the idea was all right but economically we would do better to use the Main Reading Room for a general clearing house and subsequently all books were sent there. This great room took on the appearance of a New York dock before the days of depression. Here books were taken from the boxes and put on book trucks, a box to each shelf of the truck, three in all, the box number remaining with the books until they actually reached the shelves. Long queues of trucks lined up for the elevators, each queue having but one color and the numbers following along consecutively. Stack elevators took five trucks at a time. In the stacks at three different points there were from four to six boys to get the books on to the shelves and return the empty trucks on the

next trip of the elevator. Here, too, a library staff supervisor collected the cards, supervised the shelving and allocated the boys to the best advantage. Perhaps this disposes of *How to move*.

What to move was a matter of some deliberation. The Low Library was given as a memorial building and its very magnificence entitles it to remain one. Its location is to the University as a hub is to the wheel. It seemed advisable to keep some books rather close to their laboratories, such as the natural sciences and engineering. Mathematics could function there quite as easily as it



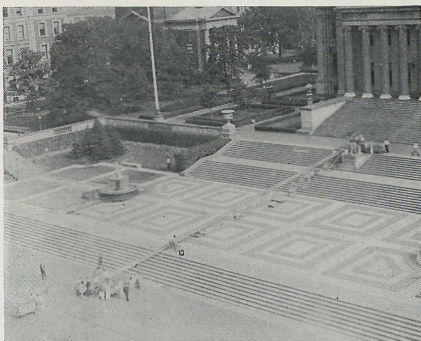
LOW LIBRARY,
SHOWING OUTSIDE ELEVATOR

could in the new building. The Chinese and Japanese libraries have become thoroughly established as distinct collections and are entirely at home in their present surroundings. The Rare Book Department is going through a series of growing pains and needs room to reach out and spread. Surely no more fitting place could be found for it than the very beautiful Low Memorial Library which

lends a scholarly and aesthetic background. Columbiana has been taking on grandiose proportions. It is a fitting historic collection of a great university and is much more accessible in the old building. All of these collections make a quite formidable library, each one entirely able to function without the general stacks. So much for *What to move*.

Rome was not built in a day nor was this move a mere matter of the five weeks it took for the actual transportation of books and equipment. *What to move where* took thought for "a thousand nights and a night." Ever mindful of the best service to students we took cognizance of the *status quo*. A new grouping of subjects might augment their usefulness and now if ever was the time to make the change. Careful observation over a long period had shown us that subjects were not placed in their most useful relation by the Dewey Decimal Classification. Particularly in European and Orien-

tal literature one needs the history of the country as well. Philosophy and classics can hardly be divorced. Religion and philosophy are closely allied. Statistics and government documents go hand in hand, and so on through the gamut. It would be an idle dream to expect to please everyone, but by bringing together things of a kindred interest we might hope to please the majority. And so we laid our plans, first putting on paper the desired grouping with considerable discussion



THE CHUTE IN OPERATION

pro and con by an appointed committee and with the final approval of the librarian.

Next came the actual mathematics. Books by subject had to be measured and set around on blue prints of the stacks like men on a chess board. Each move was influenced by a perfectly good reason for wanting this or that here or there. The result might seem scrambled to the casual observer but several months of the new arrangement have shown us that students like the scramble. Using the Loan Desk as the centre of activity and as the economic stronghold, books most called for, meaning English literature and its first cousin English history, were assigned to the Loan Desk floor. From that radiated all the other subjects with a keen regard for their relationship one to the other, Romance language and litera-

ture one tier below English, American and German one tier above and so on.

That settles the question of *Where to move* but the Shelf Department, too, had the problem of *How to move*. In the old building, blocks of books had been frequently squeezed out of their proper order and shelved in another part of the building. To get them back into place we devised the use of dummies with a large red seal to attract attention. These carried the information of how much space to leave and the supervisor of shelving counted off the sections so that in due time when these books came along marked "Special" they were set into place and the dummy removed.

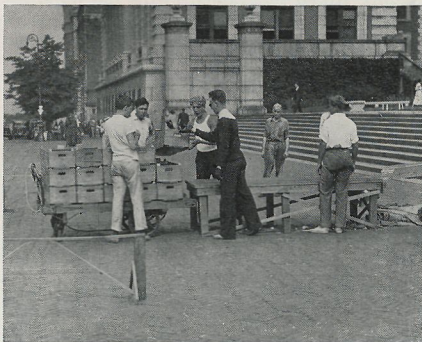
Our new grouping of subjects meant that books from one room in Low Library went to as many as seven different tiers in South Hall. The order in which things moved out was planned for only two or three days in advance as it depended somewhat on the coördination of the three units. For perfectly sound reasons, things moved more quickly from some points than from others and the extent of this could not be determined too far ahead.

In order to insure no delay in shelving books, it was necessary to have all measuring done in advance. So far as could be determined, shelves were adjusted to fit books slightly oversize and throughout the stacks range markers were put into place. This took two hundred and eighty-eight sets of the alphabet.

If publishers would print all books either octavo or quarto size movers would have fewer problems. Folios proved to be very troublesome until we hit on a happy scheme somewhere about halfway through the move. Our first experience with oversize books was in June when we moved five thousand bound volumes of newspapers from Journalism to South Hall. This was easy as they packed nicely on a flat truck and were wheeled into the 114th Street entrance and then transferred to dollies for the stacks. But the labor papers, mostly unbound and tied in cardboards, had to be gotten down the front steps of Low Library. This was before the construction of the roller coaster. These great packages were passed bucket brigade fashion until they reached the street where they were put on trucks for South Hall and arrived in the stacks in a state of hash. We had

learned one valuable lesson, that too many hands did not make light work.

Our next experiment with folio books was tying them into bundles of three or four each, numbering the bundles and sending them over on a truck, down a ramp and around three blocks, but this was extremely wasteful of time and consequently of money.



END OF CHUTE; BOOK BOXES BEING PILED ON TRUCKS

Finally, a happy thought dawned, which proved to be the right one. Except for elephantine sized volumes the books were stood upright in boxes and moved over, one box on top of every four boxes of ordinary size books, that is, three boxes out of every fifteen on a truck were folio, specially marked and numbered on "folio cards," giving their location. This worked extremely well.

A library is not made up entirely of books. Card catalogues, office furniture, bindery machinery, files, cabinets and trays go into its being. All this was moved in a most efficient manner. Cards were all measured in advance by the Cataloguing Department and labels inserted in the new trays so that the matter of transferring the cards was done in record-breaking time.

The shelf space required by the Reference Department

had been accurately calculated and books slid into place as easily as a foot into an old shoe.

Department libraries had moved in June, each having been planned by its own staff as to measurements and methods.

During the big move, stacks were closed to readers and Loan Desk service was limited to cases of real necessity. The Reference Room functioned in the old building almost up to the day of moving and at no time were we closed in all departments. Several of the reading rooms in the new building were open while the stacks were being moved and personal collections were reserved here for the convenience of the students for the duration of the summer.

Practically every member of the library staff had a responsibility of some kind. Some were definitely assigned to supervising jobs, one to collect and file the box cards and a great many to take an inventory, which began the first day the books went in and was fully three-quarters finished by the time the last books arrived. The spirit throughout was magnificent and made a difficult job one long to be remembered as an interesting one.

STATISTICS

Moved June 6 to June 13, 1934

Business Library	35,000
College Library	30,000
Carpenter Library of English	2,300
Butler Library of Philosophy	3,000
Germanic Reading Room	3,000
Classics Reading Room	2,300
Romance Languages Reading Room	1,400
Burgess Library of History, Economics and Social Science	10,000
Newspapers	5,000
Labor Papers	10,000

102,000

Moved August 18 to Sept. 19, 1934 to South Hall

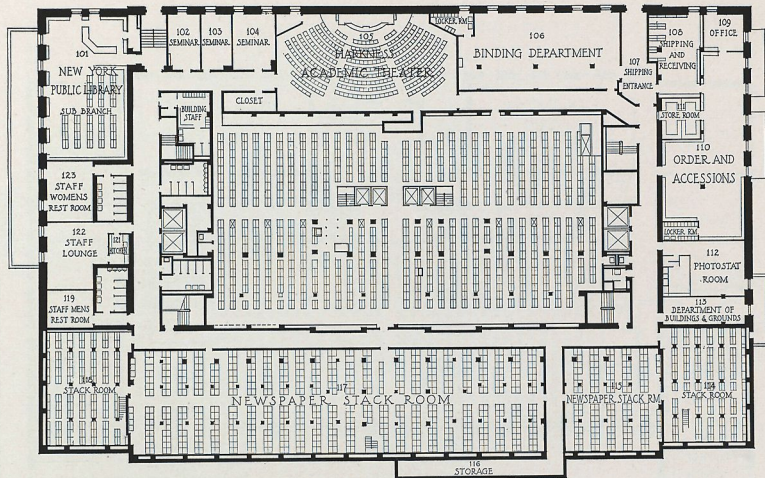
School of Library Service	26,500
Stacks	512,000
Reference Departments	18,000
Unbound Periodicals	1,200
N.Y. Public Library Sub-Branch	10,000
Dramatic Museum	4,300

572,000

Rare Book Department from Schermerhorn to Low Library	61,000
Natural Science from 113 to 422 Low Library	23,500
Engineering and Applied Science from 113 to 413 Low Library	26,200
American Mathematical Society from 113 to 306 Low Library	8,750
Fine Arts from Fayerweather to Avery	11,550

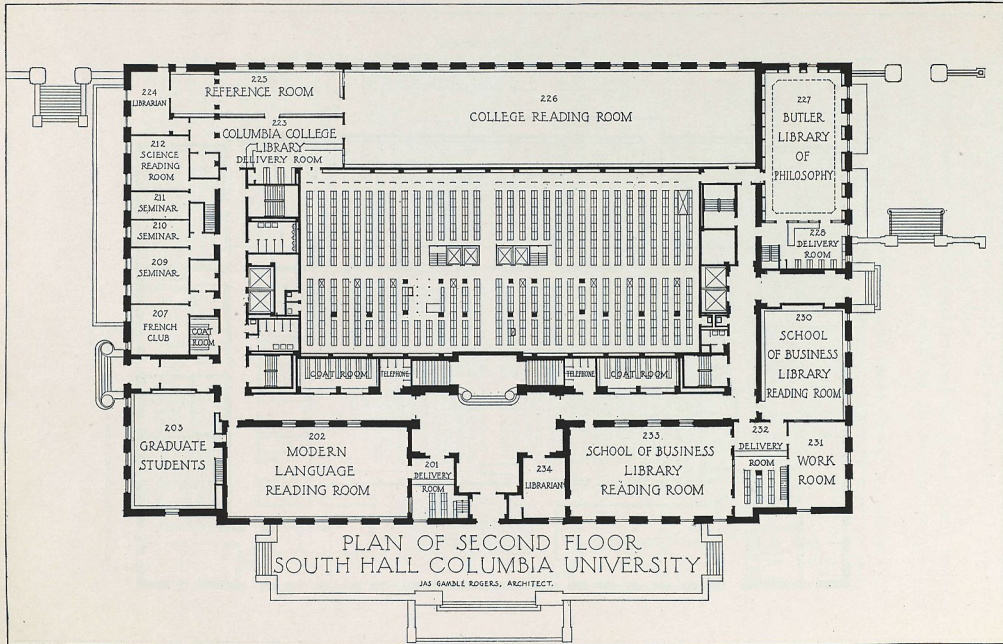
Total 805,000

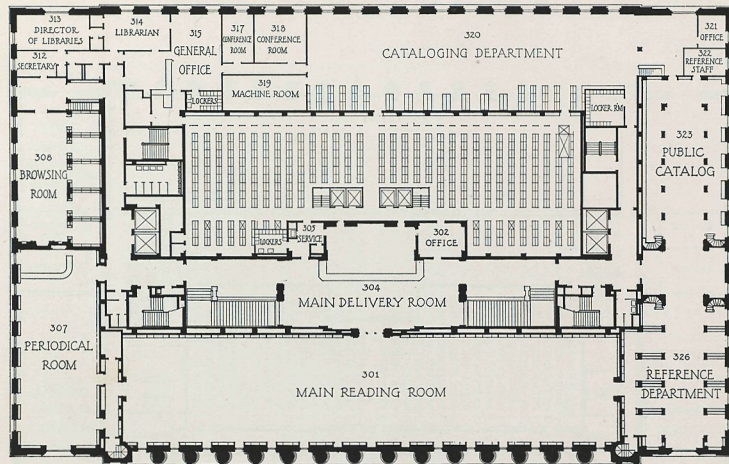
1800 truck loads; 15 boxes to a truck; 26 books to a box



PLAN OF FIRST FLOOR
SOUTH HALL COLUMBIA UNIVERSITY

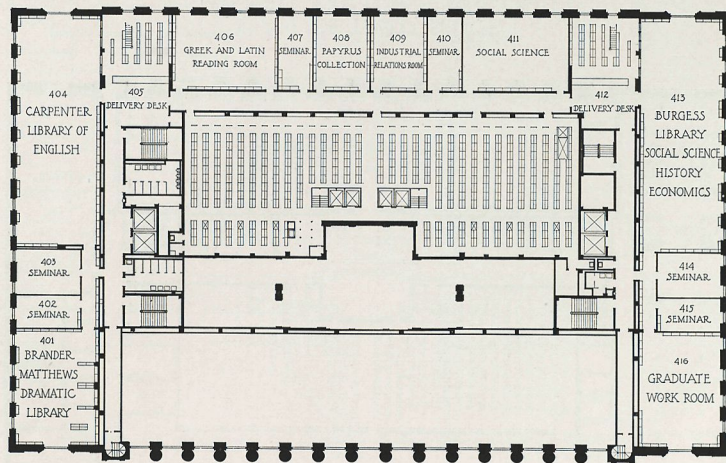
JAS GAMBLE ROGERS ARCHITECT





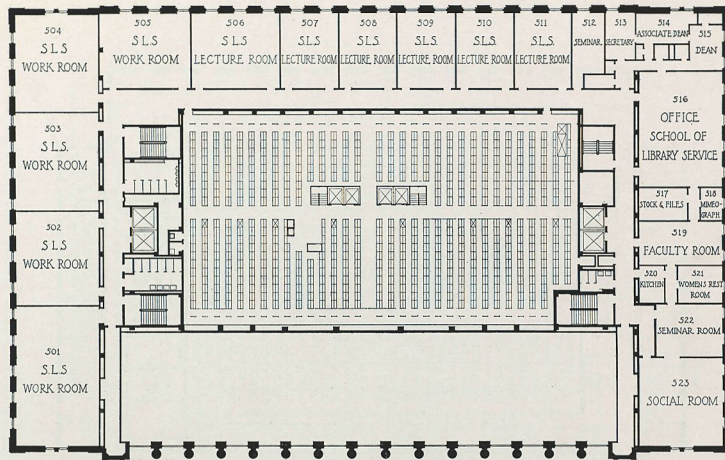
PLAN OF THIRD FLOOR
SOUTH HALL COLUMBIA UNIVERSITY

JAS GAMBLE ROGERS, ARCHITECT



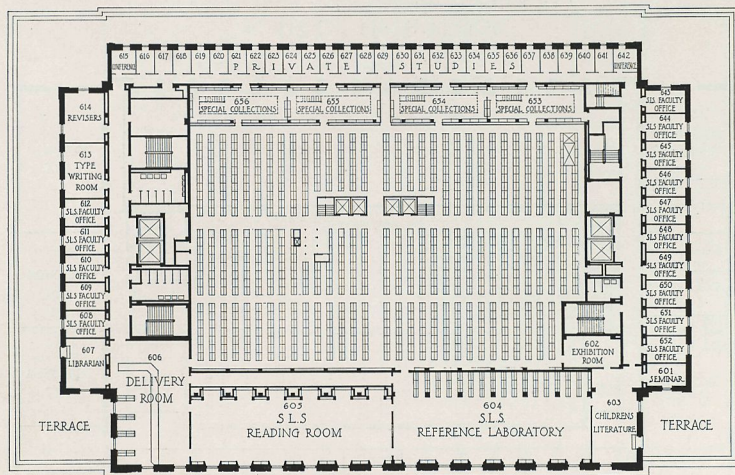
PLAN OF FOURTH FLOOR
SOUTH HALL COLUMBIA UNIVERSITY

JAS. GAMBLE ROGERS, ARCHITECT



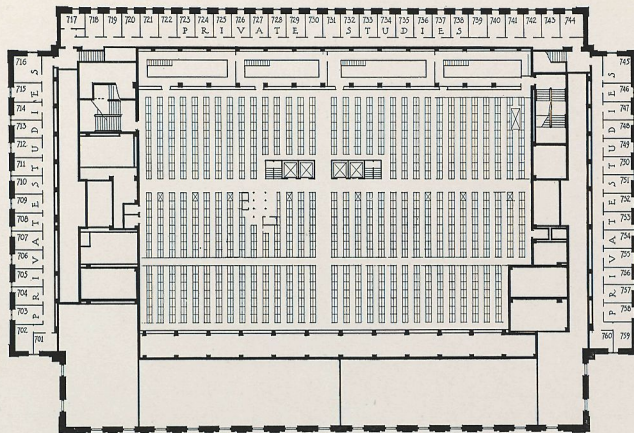
PLAN OF FIFTH FLOOR
SOUTH HALL COLUMBIA UNIVERSITY

JAS GAMBLE ROGERS ARCHITECT



PLAN OF SIXTH FLOOR
SOUTH HALL COLUMBIA UNIVERSITY

JAS. GAMBLE ROGERS, ARCHITECT.



PLAN OF SEVENTH FLOOR SOUTH HALL COLUMBIA UNIVERSITY

JAS GAMBLE ROGERS, ARCHITECT

